# ADAPTIVE BEAMFORMING METHODS AND SYSTEMS THAT ENHANCE PERFORMANCE AND REDUCE COMPUTATIONS

## ABSTRACT OF THE DISCLOSURE

Wireless communication systems and methods are provided that a) enable progressive beamforming with antenna arrays and subarrays, b) provide current and delayed versions of data-carrying signals, and c) provide time-of-arrival of data-carrying signals. The progressive beamforming substantially reduces computational complexity. The current and delayed versions of data-carrying signals facilitate optimization of spatial information and optimization of information from non-coherent delays (which are delays beyond the handling capability of a system's modulation). The time-of-arrival information is used to facilitate a single matrix inversion which substantially reduces the complexity of conventional beamforming computations.